

Claims:-

1. An apparatus for providing left and right eye images with a horizontal angle of view of at least approximately 45° along the axis of a single camera lens, the apparatus comprising optical means arranged to provide said left and right eye images as a pair of head-to-head or toe-to-toe images, i.e. with the two images separated by a center line and with either the tops of the two images or the bottoms of the two images adjacent the center line, so that the left and right eye images can be simultaneously recorded onto a single frame of a photographic film or other recording medium.

2. An apparatus as claimed in Claim 1, in which the optical means comprises two reflecting elements for each of the two images respectively, the reflecting elements being positioned in front of a camera lens.

3. An apparatus as claimed in Claim 2, in which the reflecting elements comprise first and second reflecting elements arranged to receive the left and right eye images respectively and third and fourth reflecting elements that are arranged to receive said left and right eye images from said first and second reflecting elements and to provide said left and right eye images along the axis of a camera lens.

4. An apparatus as claimed in Claim 3, in which the first and second reflecting elements comprise plane mirrors and the third and fourth reflecting elements comprise two faces of a triangular prism, the plane mirrors each being arranged to reflect the light rays of the left and

right eye images respectively onto opposing faces of the triangular prism, the triangular prism being arranged to redirect said incident light rays towards the camera lens whose axis is at 90° to the direction of view of the first and second reflecting elements.

5. An apparatus as claimed in Claim 3, which includes variable convergence adjustment means, so that the convergence of the optical axes of the left and right eye images can be varied in a manner substantially consistent with the convergence function of natural eyes.

6. An apparatus as claimed in Claim 5, in which the convergence adjustment means comprises a mechanism for varying the angle at which the first and second reflecting elements are set in relation to the direction of view and consequently to the axes of the third and fourth reflecting elements.

7. An apparatus as claimed in Claim 6, in which the first and second reflecting elements are interconnected by a mechanical linkage, such that the first and second reflecting elements are constrained to being arranged at the same angle of convergence relative to the direction of view.

8. An apparatus as claimed in Claim 3, which includes variable inter-ocular adjustment means arranged to adjust the distance between the image axes of the said first and second reflecting elements such that they are separated by a distance substantially consistent with the average inter-ocular distance of human eyes.

9. An apparatus as claimed in Claim 3, which includes an optical element arranged to extend the horizontal angle of view of the apparatus, the optical element comprising a pair of optically identical first lenses or lens groups of negative optical power, each first lens or lens group being located along the respective axes of the left and right eye images and in front of said first and second reflecting elements.

10. An apparatus as claimed in Claim 9, in which the optical element also comprises a second lens or lens group of positive power, located along the axis between the camera lens and third and fourth reflecting elements such that both left and right eye images are incident on the second lens or lens group.

11. An apparatus as claimed in Claim 9, in which the first lens group comprises a pair of individual halves of an optical element, each half optical element being placed in front of said first and second reflecting elements in correct alignment with the optical axis of the camera lens.

12. An apparatus as claimed in Claim 11, in which both halves of the first optical element are coupled to convergence adjustment means, so that operation of the convergence adjustment means causes adjustment of the two halves of the first optical element.

13. An apparatus as claimed in Claim 1 when attached to the front of a video camera having a flip-out screen, the apparatus including a viewing device attached to the flip-out screen enabling the viewer to see a three-dimensional image during recording or playback.

14. An apparatus for use in viewing a three-dimensional image, the apparatus comprising optical means arranged to simultaneously receive left and right eye images in the format of a pair of head-to-head or toe-to-toe images, i.e. with the two images separated by a center line and with either the tops of the two images or the bottoms of the two images adjacent the center line, and to provide a superimposed projected image comprising the left and right eye images to a viewing screen.

15. An apparatus as claimed in Claim 14, in which the optical means comprises first and second reflecting elements arranged to respectively project the left and right eye images, the first and second reflecting elements being arranged along an axis extending substantially at right angles to the axis of a projection lens.

16. An apparatus as claimed in Claim 15, in which inter-ocular adjustment means is provided to adjust the separation of the image axis of the first and second optical elements.

17. An apparatus as claimed in Claim 15, which includes means for adjusting the angle of incidence of said first and second reflecting elements to the central axes of the respective left and right eye images, so that the convergence of said left and right eye images is adjustable.

18. An apparatus as claimed in Claim 14, which includes polarizing means for polarizing the left and right eye images, whereby the superimposed composite image may be viewed using corresponding

polarizing filters to perceive a three-dimensional image when projected onto a screen with a suitable metallic surface.

19. An apparatus as claimed in Claim 14, which includes a viewing device comprising a viewing box into which said composite image is projected, the viewing box having one or more reflective surfaces that are arranged to project the left and right images onto a side wall of said viewing box, the viewing box further comprising a viewing window through which said projected image may be viewed.

20. An apparatus as claimed in Claim 19, in which an optical element is provided on the side wall of the viewing box on which the left and right images are projected, the optical element being arranged to reflect incident light rays back along their axes so that a three-dimensional image may be viewed with the naked eyes by a single viewer without the use of polarizing elements.